

## PATENT COOPERATION TREATY



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INTERNATIONAL PRELIMINARY EXAMINATION REPORT  
(PCT Article 36 and Rule 70)

REC'D 16 MAY 2006

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Applicant's or agent's file reference FIN 588 PCT	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/B2004/000496	International filing date (day/month/year) 26.02.2004	Priority date (day/month/year) 26.02.2004
International Patent Classification (IPC) or both national classification and IPC INV. H01L21/56 H01L21/68		
Applicant INFINEON TECHNOLOGIES AG et al.		
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of <u>7</u> sheets.</p>		
<p>3. This report contains indications relating to the following items:</p> <p>I <input checked="" type="checkbox"/> Basis of the opinion</p> <p>II <input checked="" type="checkbox"/> Priority</p> <p>III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p>IV <input type="checkbox"/> Lack of unity of invention</p> <p>V <input checked="" type="checkbox"/> Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p>VI <input type="checkbox"/> Certain documents cited</p> <p>VII <input type="checkbox"/> Certain defects in the international application</p> <p>VIII <input type="checkbox"/> Certain observations on the international application</p>		
Date of submission of the demand  28.11.2005	Date of completion of this report  15.05.2006	
Name and mailing address of the international preliminary examining authority:   European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer  Corchia, A  Telephone No. +49 89 2399-7165  	

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/IB2004/000496

**I. Basis of the report**

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17):*

**Description, Pages**

1-11 as originally filed

**Claims, Numbers**

4-13 as originally filed

1-3 received on 23.12.2005 with letter of 20.12.2005

**Drawings, Sheets**

1/2, 2/2 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).  
☐ the language of publication of the international application (under Rule 48.3(b)).  
☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.  
☐ filed together with the international application in computer readable form.  
☐ furnished subsequently to this Authority in written form.  
☐ furnished subsequently to this Authority in computer readable form.  
☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.  
☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:  
☐ the claims, Nos.:  
☐ the drawings, sheets:

**INTERNATIONAL PRELIMINARY  
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International application No. PCT/IB2004/000496

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

**II. Priority**

1. ☒ This report has been established as if no priority had been claimed due to the failure to furnish within the prescribed time limit the requested:
- ☒ copy of the earlier application whose priority has been claimed.
  - ☐ translation of the earlier application whose priority has been claimed.
2. ☐ This report has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid.

Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.

3. Additional observations, if necessary:

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Yes: Claims	1-3
	No: Claims	4-13
Inventive step (IS)	Yes: Claims	
	No: Claims	1-13
Industrial applicability (IA)	Yes: Claims	1-13
	No: Claims	

2. Citations and explanations

**see separate sheet**

**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement**

1. The following document is referred to in this communication:

D1: US 2002/027010 A1 (GLENN THOMAS P) 7 March 2002 (2002-03-07)  
D2: EP-A-1 180 792 (KOSTAT SEMICONDUCTOR CO LTD) 20 February 2002  
(2002-02-20)

2. Independent claim 1 - Article 33(3) PCT objections

The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 1 does not involve an inventive step in the sense of Article 33(3) PCT.

Document D2 discloses (the references in parenthesis applying to Fig. 11 and corresponding description in paragraph 53 of this document):

A method to assemble a leadframe strip assembly comprising the following steps:

- providing a metal foil,
- forming a plurality of leadframes in the metal foil by laser cutting or stamping (cf. par.53 ll.10-14), each leadframe comprising (cf. Figs.4-7 showing alternative structures for the leadframes of D2) a die pad (126) laterally surrounded by a plurality of contact leads (112A,112B),
- attaching a carrier tape to the metal foil (cf. par.53 ll.16-18).

The subject-matter of claim 1 differs from the method of D2 in that the leadframes are attached to each other by thin joining metal strips to form a continuous leadframe strip.

The leadframes described in par.53 and shown in the strip of Figs.14-16 of D2 are spatially isolated from each other. However, D2 teaches that various types of strips can be formed according to the manufacturer's equipment (cf. par.56 l.13). The skilled person applying the method of par.53 of D2 and using a common stamping

apparatus for a metal sheet would obtain a continuous strip containing an array of leadframes attached to each other by thin metal joining strips. He would therefore arrive at the method of claim 1 without the exercise of inventive skill.

**3. Independent claims 4,11,12 -Article 33(2) PCT objections**

The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of independent claims 4,11,12 is not new in the sense of Article 33(2) PCT.

**3.1 Regarding claim 4**

Document D1 discloses (the references in parenthesis applying to Figs. 5-8 and corresponding description in paragraphs 44-58 of this document):

A leadframe strip assembly comprising:

- a carrier tape (10) including a metal foil (20,24) attached thereon,
- a plurality of leadframes (19) formed in the metal foil each leadframe (19) comprising a die pad (20) laterally surrounded by a plurality of contact leads (24) in the metal foil.

**3.2 Regarding claim 11**

Document D1 discloses (the references in parenthesis applying to Figs.1,6-9 and corresponding description in paragraphs 53-62 of this document):

A method to assemble a leadframe strip assembly comprising the following steps (Steps 7-9 in Fig.1):

- providing a panel according to claim 10 (array 18 in Fig.6),
- removing (cf. Fig.7) the carrier tape (10), and
- singulating (cf. Fig.8) the non-leaded semiconductor packages.

**3.3 Regarding claim 12**

Document D1 discloses (the references in parenthesis applying to Fig.13 and corresponding description in paragraphs 66,67 of this document):

A non-leaded semiconductor package comprising:

- a leadframe comprising a die attach pad (20) approximately in its lateral centre, laterally surrounded by a plurality of contact leads (24) each having a contact area (26),
- semiconductor die (28) including an active surface with a plurality of die contact pads and a passive surface, attached to the die attach pad (20), electrically connected to the leadframe by a plurality of bond wires (29) connecting the die contact pads and the lead contact areas (26) of the contact leads (24),
- the upper surfaces of the die (28), contact leads (24,26), bond wires (29) and space between the die pad (20) and contact leads (24) being encapsulated with mold material (32),
- the bottom surface of the non-leaded package comprising mold material (32) and the bottom surface (21,25) of the die attach pad (20) and contact leads (24) on an essentially common plane.

#### 4. Dependent claims

Dependent claims 2,3,5-10,13 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and inventive step (Article 33(2) and (3) PCT).

4.1 As explained above (cf. section 2 of the present communication), the skilled person carrying out the method of par.53 of D2 and employing a standard stamping process producing a strip of joint leadframes, would obviously look for a method of separating the leadframes. He would then consider, among the standard options available, an etching process analogous to that described in the same document for separating the single parts of each leadframe, i.e. the conductive lands (cf. par.51 and Fig.9). Claims 2 and 3 are therefore considered not inventive.

4.2 Figures 5 and 6 of D1 (cf. paragraphs 44-52) disclose the features of claims 5,6,7 and 8 (cf. par.33-35,38),9,10.

4.3 Figure 13 of D1 discloses the features of claim 13 (cf. par.38).

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New Patent claims 1 - 3

1. A method to assemble a leadframe strip assembly comprising the following steps:

- 5       - providing a metal foil (12),  
      - forming a plurality of leadframes (3) in the metal foil (12) by laser cutting or stamping, each leadframe (3) comprising a die pad (4) laterally surrounded by a plurality of contact leads (5), the leadframe (3) being attached to each other by thin metal joining strips to  
10       form a continuous leadframe strip,  
      - attaching a carrier tape (13) to the metal foil (12).

2. A method to assemble a leadframe strip assembly according  
15       to claim 1  
      characterized in that  
      the thin joining strips are removed from the carrier tape by an etching process.

20       3. A method to assemble a leadframe strip assembly according to claim 2  
      characterized in that  
      the etching process is performed from one side of the metal foil (12) forming a plurality of isolated leadframes  
25       (3).

4. A leadframe strip assembly comprising:

- a carrier tape (13) including a metal foil (12) attached thereon,  
30       - a plurality of leadframes (3) formed in the metal foil (12) each leadframe (3) comprising a die pad (4).

FORM PTO 690PAR (Rev. 01/04)								U.S. DEPARTMENT OF COMMERCE								Name <b>Charitta Shelton</b>				Pay Period <b>11</b>	
<b>DO/EO PARALEGAL BIWEEKLY TIME WORKSHEET</b>										Team <b>2</b>								Period Ending <b>6/21/08</b>			
ACTIVITY	FIRST WEEK							WEEK 1 TOTAL HRS.	SECOND WEEK							WEEK 2 TOTAL HRS.	SUBPROJECT CODE	BI-WEEK TOTAL HRS.			
	SU	MO	TU	WE	TH	FR	SA		SU	MO	TU	WE	TH	FR	SA						
1. Contingency Time			1.0	1.0		1.0		3.0		1.0	1.0	1.0	1.0	1.0		5.0	(Q) 112534	8.0			
2. Customer Service																	(H) 011214				
3. Staff Meetings																	(K) 119002				
4. General Paralegal Training (Identify in remarks)																	(N) 090101				
5. Special Projects (Identify in remarks)																	(L) 119609				
6. Other Training (Identify in remarks and include proper subproject code)																	011097				
7. Union Activities (Identify in remarks and include proper subproject code)																					
8. Other (Identify in remarks and include proper subproject code)																	090400				
A. TOTAL OTHER TIME (1 to 8)			1.0	1.0		1.0		3.0		1.0	1.0	1.0	1.0	1.0		5.0		8.0			
B. ANNUAL LEAVE Regular ____ FMLA ____ (check one)	Total Hours					4.0		4.0				4.0	8.0			12.0	(T) 051000	16.0			
	From																Initials				
	To																				
C. SICK LEAVE Regular ____ FMLA ____ FFLA ____ (check one)	Total Hours			4.0				4.0									(U) 051100	4.0			
	From																Initials				
	To																				
D. ADMINISTRATIVE LEAVE (includes blood donations, voting, weather, holiday)	Holiday																(V) 051201				
	Miscellaneous																(W) 051202				
E. Detail	Org Code																				
F. Compensatory time taken (Enter on Comp. form)																	(Y) 055000				
G. IFP Credit Hours taken																	057000				
H. Regular Production Hours (regular hours at work minus A - G)			6.0	7.0	5.0	8.0		26.0		7.0	6.0	5.0		8.0		26.0	(D) 011207	52.0			
I. TOTAL REGULAR HOURS IN PAY STATUS (A to H)			11.0	8.0	9.0	9.0		37.0		8.0	7.0	10.0	9.0	9.0		43.0		80.0			
J. Overtime Hours In Home Group	Regular						3.0	3.0	5.0						7.0	12.0	(D) 011207	15.0			
	Holiday																(D) 011207				
Outside Home Group / Organization Code	Regular																				
	Holiday																				
K. Compensatory time Worked (Enter on Comp. form)																					
L. IFP Credit Hours worked																					
TOTAL HOURS IN PAY STATUS (I to L)			11.0	8.0	9.0	9.0	3.0	40.0	5.0	8.0	7.0	10.0	9.0	9.0	7.0	55.0		95.0			
TOTAL PRODUCTION (H & J to L)																	(D) 011207				
Remarks: _____ Supervisor Verification: _____ <div style="text-align: center;"> <b>PAY PERIOD 12</b>  <b>DAYS OF THE WEEK JUN 08, 2008 - JUN 21, 2008</b>  8   9   10   11   12   13   14   15   16   17   18   19   20   21  pay week </div> Signature: _____ Date: _____																					